

WHAT IS CLAIMED IS:

1. A method for alignment in forming a new layer on a substrate by measuring each position information of existing layers formed prior to said new layer and said  
5 new layer in a first measurement condition or a second measurement condition, comprising the steps of:  
    measuring marks formed in each of said existing layers by switching said first and second measurement conditions; and  
10      aligning said existing layers and said new layer based on measurement of mark position of said existing layers.
2. The alignment method according to claim 1, wherein  
15 said second measurement condition has a plurality of measurement conditions different from each other in an optical characteristic, and the measurement is performed by switching the plurality of measurement conditions.
- 20 3. The alignment method according to claim 2, wherein as said optical characteristic wavelengths of illumination light for the measurement are switched.
4. The alignment method according to claim 2, wherein  
25 as said optical characteristic values representing light intensity distribution condition of illumination light for measurement are switched.

5. An exposure apparatus, wherein in forming a new layer on a substrate, said new layer is formed by measuring each position information of existing layers  
5 formed prior to said new layer and said new layer in a first measurement condition or a second measurement condition, as well as measuring marks formed in each of said existing layers by switching said first and second measurement conditions, and aligning said existing layers  
10 and said new layer based on measurement of mark position of each of said existing layers.

6. An exposure apparatus, wherein an exposed object is positioned based on measurement of position information  
15 for marks formed in each of a plurality of existing layers on the exposed object on which the plurality of existing layers are disposed, and a new layer is to be formed, and then projection exposure is performed, said apparatus comprising a first measurement part and a  
20 second measurement part for measuring the position information for the marks, the first and second measurement parts being adapted such that they can be switched for marks formed in each of said existing layers.

25 7. The exposure apparatus according to claim 6, wherein said first and second measurement parts are switched manually.

8. The exposure apparatus according to claim 6, wherein  
the switching of said first and second measurement parts  
is performed based on automatic calculation of contrast  
5 executed prior to the exposure.

9. The exposure apparatus according to claim 6, wherein  
the switching of said first and second measurement parts  
is performed based on the measurement condition  
10 determined by the calculation result of contrast of the  
marks formed in each of the existing layers, and said  
measurement condition is stored.

10. A method for projection exposure by positioning an  
15 exposed object comprising a plurality of existing layers  
each having alignment marks formed therein, based on  
measurement of the alignment marks,

wherein in measuring the alignment marks in each of  
said layers, each alignment mark is measured by switching  
20 conditions of illumination light for the measurement  
depending on the alignment marks in each layer.

11. A semiconductor device manufacturing method  
comprising steps of:  
25 installing in a semiconductor manufacturing factory  
a group of manufacturing apparatuses for various  
processes including an exposure apparatus wherein in

forming a new layer on a substrate, said new layer is formed by measuring each position information of existing layers formed prior to said new layer and said new layer in a first measurement condition or a second measurement  
5 condition, as well as measuring marks formed in each of said existing layers by switching said first and second measurement conditions, and aligning said existing layers and said new layer based on measurement of mark position of each of said existing layers; and  
10 manufacturing semiconductor devices with a plurality of processes by using the manufacturing apparatuses.

12. The semiconductor device manufacturing method according to claim 11, further comprising the steps of:  
15 connecting said group of manufacturing apparatuses to each other via a local area network; and  
data-communicating information about at least said exposure apparatus of said group of manufacturing apparatuses between said local area network and an  
20 external network outside said semiconductor manufacturing factory.

13. The semiconductor device manufacturing method according to claim 12, wherein maintenance information  
25 about said exposure apparatus is obtained by accessing and communicating data with a database provided by a vender or user of said exposure apparatus via said

external network, or production control is conducted by communicating data via said external network with another semiconductor manufacturing factory other than said semiconductor manufacturing factory.

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14. A semiconductor manufacturing factory comprising:

a group of manufacturing apparatuses for various processes including an exposure apparatus wherein in forming a new layer on a substrate, said new layer is  
10 formed by measuring each position information of existing layers formed prior to said new layer and said new layer in a first measurement condition or a second measurement condition, as well as measuring marks formed in each of said existing layers by switching said first and second  
15 measurement conditions, and aligning said existing layers and said new layer based on measurement of mark position of each of said existing layers;

a local area network for connecting the manufacturing apparatuses to each other; and

20 a gateway allowing access by the local area network to an external network outside the factory,

thereby allowing data-communication of information about at least one of said manufacturing apparatuses.

25 15. A maintenance method for an exposure apparatus installed in a semiconductor factory, wherein in forming a new layer on a substrate, said new layer is formed by

measuring each position information of existing layers formed prior to said new layer and said new layer in a first measurement condition or a second measurement condition, as well as measuring marks formed in each of

5 said existing layers by switching said first and second measurement conditions, and aligning said existing layers and said new layer based on measurement of mark position of each of said existing layers, the maintenance method comprising the steps of:

10 a vender or user of said exposure apparatus providing a maintenance database connected to an external network of the semiconductor manufacturing factory;

allowing access to said maintenance database from inside of said semiconductor manufacturing factory via

15 said external network; and

transmitting maintenance information stored in said maintenance database via said external network to the semiconductor manufacturing factory side.

20 16. An exposure apparatus further comprising a network interface and a computer for executing network software, thereby allowing maintenance information for an exposure apparatus to be data-communicated via a computer network.

25 17. The exposure apparatus according to claim 16, wherein said network software provides on said display a user interface for accessing a maintenance database

connected to an external network of a factory with said exposure apparatus installed therein and provided by a vender or user of said exposure apparatus, thereby allowing acquisition of information from the database via  
5 said external network.